yellow oblique stripe extending from the humerus to the middle of the elytra near the suture then curved and extending nearly directly outwards toward the margin; another short, longitudinal stripe near the suture at apex. Tarsi and under side of femora black, tibiæ and upper edge of femora luteous. Length .12—14 inch; 3—3.5 mm.

Specimens are from Vermont, Middle States and Tennessee.

The following are unknown to me:—

Stenelmis elongatus, Motsch. Etudes. 1859, p. 51.
Stenelmis humerosus, Motsch. idem. p. 50.
Stenelmis sordidus, Motsch. idem. p. 51.

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Notes on some Genera of COPROPHAGOUS SCARABÆIDÆ of the United States.

BY GEO. H. HORN, M. D.

COPRIS, Geoff.

Our species are but few in number and seem hardly to call for a separate essay, but as several of them are closely allied and their descriptions widely separated, the present paper may be of advantage to many.

Two sub-genera are indicated in our fauna.

PINOTUS, Erichs, (Archiv. 1847, I. p. 109).—Each elytron 7-striate; hind tibiæ dilated at apex, outer edge crenulate, never with an oblique ridge or tooth, spur obtuse or emarginate at apex; front parabolic, genæ in front of eye oblique, angle obtuse.

This subgenus is identical with Haldeman's *Brachycopris*.

COPRIS. Auct.—Each elytron 8-striate: hind tibiæ compressed, outer edge with an oblique ridge or tooth near the middle, spur long acute; front semicircular, genæ rectangularly produced, angle acute.

C. (Pinotus) carolinus, Linn. (*Scarabacus*) Syst. Nat. I. 2, p. 545; Drury, Exot. Col. I, p. 77, pl. 35, fig. 2; Hald. (*Brachycopris*) Proc. Acad. III, 125.

Our largest species. This species may be further distinguished from those of the next subgenus by the presence of a moderately deep excavation on the underside of the prothorax within the anterior angle, for the lodgment of the antennal club in repose; also, by the absence of any elevated line proceeding from the coxæ outwards. Length .80—1.10 inch; 20—28 mm.

Abundant Southwardly and Westwardly of Pennsylvania.

Our remaining species belong to the subgenus *Copris*.

Thorax opaque, densely, coarsely and evenly punctured.....**anaglypticus**, Say.

Thorax more or less shining, very unevenly punctured:

Clypeus obtusely notched at middle.....**mœchus**, Lec.

Clypeus broadly emarginate at middle, between two small, distant, obtuse teeth.....**remotus**, Lec.

Clypeus acutely and rather deeply notched between two approximate rounded teeth.....**minutus**, Drury.

In addition to the characters given above all our species of this sub-genus have an elevated ridge extending from the outer angle of the anterior coxæ to near the anterior angle of the prothorax, while the depression for the antennal club seen in *Pinotus* is not evident here.

C. anaglypticus, Say, Journ. Acad. III, p. 204.

Easily known from all the species of the subgenus by the dense, coarse punctures of the thorax. The clypeus is acutely notched at middle, the angles of the notch obtusely rounded and a slight sinuation on the outer side of each. The middle of the anterior edge of the prosternum is armed with a tooth, obtuse at tip, which arises suddenly. Elytral striæ broad, punctures transverse. Length .52—.70 inch; 13—18 mm.

Abundant from Canada to Texas.

In the southern and western specimens the horn of the head of the male is frequently long. In females or in more northern forms the horn is very short or reduced to a mere tubercle.

C. mœchus, Lec. Proc. Acad. 1854, p. 222.

Similar to the preceding, but differs in having the thorax much more sparsely and irregularly punctured and not opaque. The clypeal emargination is a broad notch. The middle of the anterior edge of the prosternum is acutely produced but not in the manner of a suddenly formed tooth. Length .76 inch; 19 mm.

Texas.

C. remotus, Lec. Proc. Acad. 1866, p. 581.

The middle of the anterior edge of the prosternum is broadly and obtusely produced. The clypeus is slightly emarginate at middle between two distant, small obtuse teeth. The hind tarsi are shorter and broader than in any of our species, the joints 2, 3 and 4 being as broad at distal end as long, while in all our other species they are nearly twice as long as broad. Surface shining, thorax coarsely punctured, nearly smooth at base. Length .54—.64 inch; 13.5—16 mm.

Texas and Matamoras, Mexico.

C. minutus, Drury, (*Scarabaeus*) Exot. Ins, p. 78, pl. 35, fig 6; *Ammon* Fab. (*Copris*) Entomologia I, 44; Olivier, Ent. I, 3, p. 123, pl. 12, fig. 111; *Lar* Fab. Mantis 1, p. 13; *reflexus* Panz. Fauna Am. Bor. p. 7; *silenus* Fab. Ent. 1. p. 18. (The latter was described from an erroneous locality.)

Easily known by its small size and smooth clypeus. The front is acutely and rather deeply notched, the angles of the notch forming obtusely rounded teeth, bounded exteriorly by a slight sinuation. The prosternum in front has a rather long acute spine arising suddenly. The vertex is usually tuberculate though often with a short, slender horn. Length .32—.44 inch; 8—11 mm.

Abundant from Canada to Florida and Texas, and to the base of the Rocky Mountains.

CANTHON, Hoffm.

The present short review has been prepared in order to place before the American student the means of recognising our species, as well as to enable certain of those least known to be recognised abroad. In his admirable monograph of this genus, Harold has been unable to place certain of our species in their systematic positions, as many of the characters made use of by him have not been previously recognized. In this monograph all our species known to him have been correctly diagnosed.—(*Berlin Entom. Zeitschrift*, 1868.)

Our species may be arranged as follows:—

Hind tibiæ with two spurs:
  Clypeus bidentate; body smooth, shining, deep blue.....**indigaceus**, Lec.
  Clypeus 6-dentate; body sparsely granulate, opaque, black...**nigricornis**, Say.
Hind tibiæ with a single spur:
  Hind femora coarsely punctured and setigerous:
    Thorax densely, not coarsely, granulate.....**praticola**, Lec.
    Thorax sparsely and coarsely punctured.....**puncticollis**, Lec.
  Hind femora smooth:
    Hind tibiæ distinctly arcuate, gradually broader to apex.....**cyanellus**, Lec.
    Hind tibiæ either straight or very feebly arcuate:
      Clypeus acutely 6-dentate; emargination between middle and hinder tooth deep:
        Body nearly smooth.....**probus**, Germ.
        Body opaque and granulate:
          Finely and densely granulate; lateral striæ of elytra deeper.....**ebenus**, Say.
          Coarsely and sparsely granulate; lateral striæ of elytra equal.....**depressipennis**, Lec.
      Clypeus 4-dentate, without lateral deep incisure:
        Humeral stria of elytra never carinate, often absent:
          Thorax coarsely, elytra less coarsely punctured, punctures squammuligerous, surface shining, eyes large.....**perplexus**, Lec.
          Thorax punctured or granulose, surface black opaque, not squammuligerous, eyes small.....**simplex**, Lec.
        Humeral stria distinctly carinate at base.....**lecontei**, Harold.
      Clypeus bidentate, hind tibiæ feebly arcuate (especially in ♂):
        Surface smooth or feebly punctured.....**viridis**, Beauv.

Surface opaque, granulate:
Eyes larger, antennæ ferruginous.....**vigilans**, Lec.
Eyes smaller, antennæ dark brown:
Thorax finely rugose and punctured.....**chalcites**, Hald.
Thorax distinctly granulate.....**lævis**, Drury.

C. indigaceus, Lec. Proc. Acad. 1866, p. 280.

Easily known by its deep blue color, smooth surface, and by having two spurs to the hind tibiæ. Length .40 inch; 10 mm.

Fort Whipple, Arizona.

C. nigricornis, Say, (*Atcuchus*) Journ. Acad. III, p. 207; Lec. (*Canthon*) Col. Kansas, p. 10.

Body black opaque, sparsely granulate. Clypeus 6-dentate. Hind tibiæ with two spurs. Length .25—.35 inch; 6—9 mm.

Texas, Kansas, Middle States and Georgia.

C. praticola, Lec. Col. Kansas, p. 10.

Similar in form and sculpture to the preceding, but more elongate and less narrow behind. Differs especially in the hind femora being coarsely punctured and setigerous. Length .25—.38 inch; 6.5—9.5 mm.

Kansas.

C. puncticollis, Lec. Proc. Acad. 1866, p. 381.

Smaller, smoother and less opaque than *praticola*, Lec. The thorax is coarsely and sparsely punctured. Hind femora punctured and setigerous. Length .24—.28 inch; 6—7 mm.

Cape St. Lucas, Lower California.

C. cyanellus, Lec. Col. Kansas, p. 11; *speciosus* Harold, Berl. Ent. Zeitschrift, 1868, p. 41.

Greenish blue, smooth, shining. Hind tibiæ arcuate. Clypeus four toothed, the two middle teeth being very slender, the lateral teeth broad and triangular. Length .33—.37 inch; 8.5—9.5 mm.

Mexico (Harold), Texas (Ulke).

C. probus, Germar, (*Ateuchus*) Spec. Nov. p. 98; *abrasus* Lec. (*Canthon*) Col. Kansas p. 11.

Hind femora smooth, impunctured, tibiæ straight. Clypeus six-dentate, teeth acute, incisure between the hinder tooth and the one immediately in front of it deep. Surface nearly smooth. Length .23—.25 inch; 6—6.5 mm.

I have no hesitation in uniting the species of Leconte to that of Germar, and although some slight differences exist between the description and Leconte's unique, it must be remembered that both species have been described from single specimens.

Georgia.

C. ebenus, Say, (*Ateuchus ebenus*) Journ. Acad. III, 208.

With a clypeus as in *probus* this species has a very opaque surface rather densely covered with coarse granules. The striæ of the elytra are barely distinct on the disc and quite deep toward the sides. Length .30—.42 inch; 7.5—11 mm.

Texas, Kansas and Tamaulipas.

C. depressipennis, Lec. Col. Kansas, p. 10.

Similar to the preceding, but very much less coarsely granulate and opaque. Striæ of elytra similar to each other. Length .32—.36 inch; 8—9 mm.

Georgia.

C. perplexus. Lec. Journ. Acad. Ser. II, vol. I, p. 85.

Easily known by its small size, brown bronzed, shining surface, coarsely punctured thorax, each puncture of the thorax and elytra bearing a small, recumbent, scale-like hair. Clypeus 4-dentate. Hind tibiæ slightly arcuate. Length .18—.20 inch; 5—5.5 mm.

Texas.

C. simplex, Lec. Pacif. R. R. Rep. App. I, p. 41; *corvinus* Harold, Berl. Ent. Zeitschrift, 1868, p. 129.

Easily recognizable by the characters given in the table. I cannot agree with Harold in separating *corvinus* as distinct. Several distinct varieties may be noted, however;

simplex.—Surface entirely opaque, thorax not punctured.—Oregon.

corvinus.—Surface entirely opaque, thorax punctured.—California and Arizona.

militaris.—Surface opaque, thorax less punctured, humeri red.—Cal. (Tejon and Visalia.)

humeralis.—Surface less opaque, thorax less punctured and shining; humeri polished.—California (Coast Mts. South).

The transition from those with impunctured thorax and those in which it is so punctured, is so gradual as not to be at all defined. The slight transverse plication of the elytra behind the humeri is an individual character, some have it and many more are without it.

Harold appears to have known but one specimen of *simplex.* My own series is large, and my observation in California leads me to consider all these forms as mere local varieties and not distinct species. Length .23—.38 inch; 6—9.5 mm.

Oregon, California and Arizona.

C. lecontei, Harold, Berl. Zeitsch. 1868, p. 68.

Remarkably like *probus* but differs in having the humeral stria carinate at base. The hinder tooth of the clypeus is obtuse, and the notch between it and the next one very slight. The head and thorax

are densely and finely granulate, almost rugose. Length .25 inch; 6. mm.

Texas.

C. viridis, Beauv. (*Copris*) Ins. Af. et. Amer. p. 23, pl. 3, fig. 2; *viridicatus*, Say, (*Onthophagus*), Bost. Journ. I, 175; *obsoletus*, Say, (*Ateuchus*), Journ. Acad. III, p. 208.

Easily known by its small size, bidentate clypeus, and slightly arcuate hind tibiæ. Surface shining, very finely punctured, and green or bronze in color, the latter being the *obsoletus*, Say. Length .16—.20 inch; 4—5 mm. The smallest species of the genus.

Southern and Western States, also in Central America.

C. vigilans, Lec. Journ. Acad. Ser. II, vol. IV., 1858, p. 16.

Our largest species. Easily distinguishable from the two following by the larger eyes. Surface granulate and opaque. Length .64—.84 inch; 17—22 mm.

Pennsylvania, Delaware, Missouri, Kansas and Texas.

C. lævis. Drury, (*Scarabæus*), Exot. Ins. I, p. 79, pl. 35, fig. 7; Oliv. Ent. I, 3, p. 160, pl. 10, fig. 89; *pilularius*, DeGeer Mem. Ins. IV., p. 311, pl. 18, fig. 14, *volvens*, Fab., (*Ateuchus*) Syst. El. I, 60; *volvens*, Cast. (*Canthon*) Hist. Nat. II, 68; *obtusidens*, Zeig. Proc. Acad. II, 45.

This species is entirely too well known to need comment. Several varieties, all having the thorax and elytra distinctly granulate may be noted.

Obtusidens. Zeig., in which the teeth of the clypeus are barely distinct. These are usually old specimens and have the teeth of the anterior tibiæ also obtuse.

Viridescens, Lec., (Coll.)—Surface bright green. The clypeus normally dentate.

The more general color is a dull black with a tinge of copper. Length .40—.75 inch; 10—19 mm.

Widely diffused over the entire region east of the Rocky Mts., westward into Arizona, and south through Northern Mexico.

C. chalcites, Hald. Proc. Acad. I, 304.

I cannot agree with Harold in uniting this with the preceding. The elytral sculpture is similar, but the granules are more sparsely placed. The thorax is finely and intricately rugose and not granulate as in *lævis*. I have seen specimens of the latter in which the thorax was quite smooth, yet very evident traces of the granules remain in smooth round spaces between which are the finer granules, visible even in strongly granulate specimens only under high power. The form of *chalcites* is more robust, being shorter and broader than *lævis*. Length .59—76 inch; 13—19 mm.

Missouri and Kansas.

AMECHANUS, nov. gen.

The above generic name is proposed for our species of *Athyreus*, of which there are three, differing from that genus by the scutellum being broad, triangular with the sides rounded, and not depressed below the level of the elytra. The very narrow linear and depressed scutellum is seen only in *Athyreus* and *Stenaspidius* in the group Geotrupini, while the form of scutellum of our species is very similar to that seen in the *Geotrupes* or *Bolboceras*.

When viewed from the front (or lower side when the legs are extended) the middle and hind tibiæ present two distinct forms of apex, viz:—

Outer apical angle deeply emarginate (fig. 1).....**ferrugineus.**
fossatus.
Outer apical angle truncate, (fig. 2).....**serratus.**

A. ferrugineus, Beauv. (*Scarabœus*) Ins. Af. et. Amer. p. 90, pl. 2, fig. 3; Klug (*Athyreus*), Abh. Berl. Ac. 1843; *furcicollis*, Cast. Hist. Nat. II, p. 104.

Brownish or ferruginous, not shining. Viewed from above the head (♂) is flat, anteriorly truncate or feebly emarginate, sides of front straight, genæ produced at a right angle, with the outer angle also right. The head of the female is furnished with an obtuse tubercle. The sides of the thorax are gradually rounded from base to apex and not serrate. Length .75 inch; 19 mm.

Southern States.

A. fossatus, Hald. (*Athyreus*) Proc. Acad. 1853, 362.

Similar to *ferrugineus* in color but more shining. The head of the male is strongly bisinuate in front; the sides of the thorax are gradually rounded from base to apex but sinuate and finely serrate near the anterior angle. The thorax is suddenly elevated in front, the anterior angles of the elevation acute and project outward, on each side a deep groove or fossa limited exteriorly by an obtuse tooth-like elevation. In *ferrugineus* the thoracic ornamentation is similar but the angles of the median prominence are turned upwards and the lateral fossæ less deep. Length .75 inch; 19 mm.

Texas. Only males are known.

A. serratus, Lec. (*Athyreus*) Proc. Acad. 1854, 80.

Differs from both the preceding species in the form of the middle and hind tibiæ as well as by having the thorax strongly serrate. The elytra are smoother, the striæ less distinct and scarcely punctured. In both sexes the head resembles the form seen in the female of *fer-*

rugineus. The vertex is flat in the male but with a transverse elevated ridge or short transversely flattened horn in the female. The thorax is less abruptly elevated in front than in the other species and the processes less strongly developed. When viewed anteriorly the thorax presents a faint median groove, on each side a deeper fossa bounded by an obtuse elevation. On each side of the thorax is an acutely elevated line proceeding upwards from a short distance behind each anterior angle, parallel with the base of the thorax. Of this lateral ridge no trace is found in either *ferrugineus* or *fossatus*. Length .46—.74 inch; 12—18.5 mm.

From Texas to Fort Yuma, California.

The following table will also serve to distinguish the species:—

Margin of thorax entire.....**ferrugineus.**
Margin of thorax serrate;
Sides of thorax sinuate near anterior angle.....**fossatus.**
Sides of thorax gradually rounded, not sinuate.....**serratus.**

BOLBOCERAS. Kirby.

Our species are two in number and are readily distinguished.

B. lazarus, Fab., (*Scarabæus*) Syst. 1, 11; Oliv. Ent. I, 3, p. 63, pl. 16, fig. 146. *melebœus*, Fab. Syst. I. 20; Westw. Trans. Linn. Soc. 1852, p. 28, pl. 4, fig. 26.

The body is uniform castaneous in color, smooth and shining. The elytra have never more than five punctured striæ between the suture and humeral prominence. The well developed males have a flattened horn arising from the clypeus, slightly recurved and truncate or emarginate at tip. There is also an elevated transverse line on the vertex. The club of the antennæ is elongate oval in both sexes, with the first joint smooth and shining. In the females the clypeal horn becomes a ridge, while the vertical ridge seen in the male is more prominent. Length .20—.50 inch; 5—13 mm.

This species is distributed over the entire region east of the Rocky Mountains.

B. farctus. Fab. (*Scarabæus*) Species 1, 14; Panzer, Faun. B. A. p. 3; Klug Monog. p. 51, (Abhand. Berl. Ac. 1843); *Cephus* Fab. Id. p. 19; Oliv. Ent. 1—3, p. 68, pl. 11, fig. 96; *tumefactus* Beauv. (*Scarab.*) Ins. p. 91, pl. 2, fig. 6.

This species is much more robust than the preceding. The color is yellow with the tibiæ occasionally darker. The head is black, also a narrow space along the base and sometimes a discal spot of the thorax. The elytra have the first interspaces black, also a subapical space becoming at times so large as to to involve more than half the elytra. The males have the anterior edge of the clypeus and the angles of the genæ acutely but slightly elevated. The horn is always short, acute at apex, and arising from the vertex. The females have merely a

transverse ridge on the vertex, slightly sinuate on top. The thorax of the female has in front an elevated ridge. The male has in addition a deep fossa below each end of the ridge, bounded exteriorly by an acute elevation. The ends of the ridge are also elevated into an acute tooth-like process. After a very careful study of many specimens I cannot but consider as one species, the two forms about to be described.

Two varieties may be distinguished in this species:—

a.—*tumefactus*, Beauv.—Elytra with seven striæ between the suture and humerus.

b.—*farctus*, Fab.—Elytra with five striæ only.

The less number in the latter form is caused by a partial or total obliteration of the 2nd and fifth striæ. The antennal club in both forms is broadly oval or round.

This species is as widely diffused as the preceding, and is similar in length, being, however, broader and more convex.

ODONTÆUS, Klug.

This genus may be readily known from the preceding by having the eye entirely divided by a narrow process of the anterior canthus.

Three species are known from the United States.

O. filicornis, Say (*Bolboc.*) Journ. Acad. 3, 211.

Pale castaneous or ferruginous in color, shining. The male has the horn movable as in the European species. Length .34 inch; 8.5 mm.

Middle and Central States.

O. cornigerus, Mels. (*Bolboc.*), Proc. Acad. II, 138.

Similar in color to the preceding, but occasionally black. The horn is less slender than in *filicornis* and fixed. This species attains a somewhat larger size than the preceding and is usually more robust.

Middle and Central States.

O. obesus, Lec. Proc. Acad. 1859, 282.

Of this species both sexes are now known. It is larger, more robust, with the elytral striæ less deep and closely punctured. The base of the thorax is much less sinuate than in either of the preceding species, and the hind thoracic angles are rectangular. The sides are gradually narrower from base to apex and rather feebly rounded. The male is rather smaller than the female and differs from the male of *cornigerus* by a less densely punctured thorax, with regularly but feebly rounded sides. The processes from the upper surface on each side are acute at apex. Frontal horn fixed. Length .44 inch; 11 mm.

Occurs at Table Mountain, south of San Francisco, Cal.

ONITIS, Fabr.

O. nicanor, Fabr. Ent. Syst. I. p. 54; Syst. Eleut. I. p. 29.

The habitat of this insect has long been supposed to be North America; recent investigations have shown it to be a West Indian insect identical with *Phanæus sulcatus* Drury. The unique specimen in the cabinet of Leconte, and which had been in the possession of Hentz and Harris, has been ascertained to be a South African species, *O. (fossor* Boheman, fide Sallé) *fodiens?* Boh. The determination of the identity is due to A. Sallé, from an examination of the specimen, (Ann. Ent. Soc. France, 1869, p. 501, note).

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BIOLOGICAL NOTES ON DIPTERA.—(Article 2nd.)

BY R. OSTEN SACKEN.

I.—A new American ASPHONDYLIA.

In a previous paper (Trans. Am. Ent. Soc. 1869, p. 299,) I have attempted to give a closer definition of the genus *Asphondylia*, and have described the first American species of the genus, *Asphondylia monacha*, n. sp., producing a gall on *Solidago*. In the same paper I mentioned a second, as yet undescribed species, *Asphondylia helianthi globulus*, Walsh in litt. Recently, a third species has been added to the list, producing a large flower-gall on *Rudbeckia*. It has been communicated to me by Mr. Jacob Stauffer, in Lancaster, Penna., together with drawings of the gall.

Concerning the gall, Mr. Stauffer writes as follows: "On the 21st of August I met with very large galls, formed on the flower of *Rudbeckia triloba?* They were in one case nearly round, of the size of a large apple; the other was an aggregation of galls of various sizes, forming a large excrescence."

In a few days the fly was obtained in numbers, as well as a parasitical hymenopteron, a *Callimome*, apparently identical with *C. advena*, O. S., which I had previously obtained from the gall of *Diastrophus nebulosus* on blackberry bushes.

Asphondylia rudbeckiæ conspicua, n. sp.—About 0.18 of an inch long. Grayish brown, thorax above opaque, grayish, with rows of blackish hairs; abdomen brown, with paler hairs; halteres brown; feet almost uniformly brownish, (paler when the hairs are rubbed off); wings rather dusky; the vein ending in the apex of the wing is gently arched towards its tip. Ovipositor dark brown; (described from dry specimens).

This *Asphondylia* shows the most important characters of its con-